

REMARKS

This Amendment C is responsive to the Office Action mailed July 26, 2007. Entry of these amendments and remarks, and reconsideration and allowance of the application as so amended, is earnestly requested.

Status of the Claims

The previous rejections based on Sodickson, U.S. Publ. Appl. 2002/0158632 and Heid, U.S. Patent No. 6,369,569 have been withdrawn.

Claims 1-3, 6, 8-11, 12, 14, and 16 now stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Brittain et al., U.S. Pat. No. 6,897,655 (hereinafter "Brittain"). Claims 4, 5, and 13 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Brittain. Claim 7 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Brittain in view of Madore, U.S. Pat. No. 6,714,010.

The status of claims 9, 10, and 15 is uncertain. The Office Action does not reject claims 9, 10, or 15, but the detailed explanation addresses these claims together with those claims rejected under § 102(e).

The drawing objections are addressed

Claim 17 calls for the magnetic resonance imaging device of claim 12, the predetermined path being a straight line and the magnet system comprising a cylindrical magnet. The Office Action objects that the "straight line" and the "cylindrical magnet" are not illustrated. However, the straight line is not a structural feature of the apparatus, and accordingly does not need to be illustrated. The cylindrical magnet is illustrated as first magnet system (2) shown in Fig. 1 (see also page 4 lines 31-33. While the drawing of the cylindrical magnet is diagrammatic, this is in accordance with MPEP §608.02(d) which states that conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation. It is respectfully submitted that a cylindrical magnet is a conventional feature that is well known in the MR arts.

Accordingly, it is respectfully requested that the drawing objections respective to claim 17 be withdrawn.

Claim 18 has been amended to depend from method claim 1, and to remove reference to the open magnetic resonance system. Again, the curved path is not a structural element and need not be illustrated, any more than the predetermined path of method claim 1 needs to be illustrated.

Accordingly, it is respectfully requested that the drawing objections respective to claim 18 be withdrawn.

The Brittain Reference

Like the present application, Brittain relates to magnetic resonance imaging of a continuously moving subject, and to suppressing slab boundary artifacts. (The slabs of Brittain correspond to the sub-volumes of the present application; the present application uses "sub-volumes" and "slabs" interchangeably, e.g. p. 5 line 4).

In Brittain, a slab thickness is chosen that is smaller than the imaging volume (called the "optimal imaging volume" in Brittain; the "desired FOV" is apparently the size of the subject to be imaged, and is larger than the optimal imaging volume; see col. 17 lines 10-17). Imaging data is acquired for the slab (col. 2 lines 63-64; col. 17 lines 16-17).

However, in Brittain **the slab is fixed** respective to the magnet during the scan (col. 2 lines 33-35; col. 3 line 18; col. 6 lines 18-20; col. 12 lines 6-8; col. 17 lines 42-51) **while the table moves continuously** respective to the MR system (or equivalently, as Brittain points out, the system moves respective to the table, e.g. see col. 6 lines 12-17). Since the magnet is part of the MR system, it follows that the slab moves respective to the patient. The effect of this approach is to produce slanted k-space sampling respective to the subject, as shown in the FFT(z) output of Figs. 3 and 8, which is corrected during image reconstruction.

It should now be readily apparent that the present application is fundamentally different. **Claim 1**, for example, calls for defining a sub-volume of the imaging volume that moves together with the subject, and performing a magnetic resonance image data acquisition for the sub-volume while the sub-volume remains within the imaging volume. The sub-volume of claim 1 moves with the subject,

whereas in Brittain the sub-volume (i.e., slab) is fixed with the magnet and hence does not move with the subject during continuous table motion.

Because of this difference, the present application does not have the issue of k-space sampling line skewing to deal with. However, movement of the sub-volume with the subject during imaging introduces other difficulties.

For example, it would be a problem if the sub-volume were to leave the imaging volume during the imaging due to its tracking of the patient motion. Claim 1 addresses this concern by calling for the sub-volume to be selected such that the time of movement of the sub-volume within the imaging volume is sufficient for magnetic resonance image data acquisition of the sub-volume with a predefined resolution. The specification enables this selection operation, e.g. page 6 lines 17-33.

Claim 10 calls for a computer readable medium containing instructions for controlling a computer system for magnetic resonance imaging comprising defining a sub-volume of an imaging volume provided by a magnetic field, continuously moving a sub-volume along a predetermined path together with a subject, and performing magnetic resonance image data acquisition for the sub-volume as it moves together with the subject. The slabs of Brittain are stationary relative to the magnet and accordingly do not move together with the subject.

The imaging of claim 10 further comprises the sub-volume being selected such that the time of movement of the sub-volume within the imaging volume is sufficient for the performing of the magnetic resonance image data acquisition with a preferred resolution. In Brittain, there is no such selection – since the slab is stationary in Brittain, it cannot move outside of the imaging volume during the acquisition and so the selection called out in claim 10 is not performed.

Claim 12 calls for a control unit configured for generating of control signals for magnetic resonance image data acquisition within a sub-volume of the imaging volume, the sub-volume being moved along a predetermined path along with the subject, the sub-volume being selected such that the time of movement of the sub-volume within the imaging volume is sufficient for magnetic resonance image data acquisition with a predefined resolution and for subsequent magnetic resonance image data acquisition within a subsequent sub-volume which neighbours the sub-volume on the predetermined path. Brittain does not disclose or fairly suggest the

sub-volume being moved along a predetermined path along with the subject. Since Brittain employs fixed slabs, it further follows that Brittain does not disclose or fairly suggest the selection made by the control unit of claim 12.

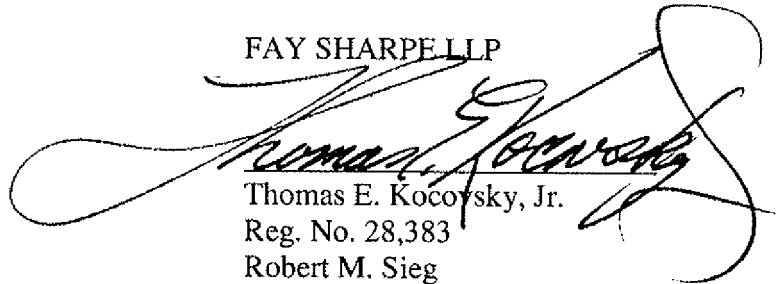
CONCLUSION

For the reasons set forth above, it is submitted that claims 1-20 (all claims) distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event personal contact is deemed advantageous to the disposition of this case, the Examiner is requested and authorized to telephone the undersigned at (216) 861-5582.

Respectfully submitted,

FAY SHARPE LLP

A large, stylized handwritten signature in black ink, which appears to read "Thomas E. Kocovsky, Jr.", is written over the printed name and extends to the right of the text block.

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